ISSN 0030-9885
Coden: PSIRAA 32(3) 141-218 (1989)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 32, No. 3, March 1989

Published monthly by

PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pak. j. sci. ind. res., vol. 32, no. 3, March 1989

CREEP PROPERTIES OF 7075 ALUMINIUM ALLOY UNDER INTERMITTENT STRESSING

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(Received December 18, 1988)

AA-7075 alminium alloys are being extensively used in aircraft structures and also as ultracentrifuge rotors. At times they are subjected to cyclic loading at high temperatures. We have investigated creep phenomena, under constant and intermittent stressing, of flow-turned AA-7075-T6 tubes of 1mm wall thickness using hydraulic pressure at 70°, maximum temperature to which a centrifuge rotor is usually subjected in operation. It has been concluded that AA-7075 under intermittent loading has lower creep rate than that at continuous loading due to the precipitation of G.P. Zones at a faster rate. These results are consistent with the theoretical expectations and are also in complete agreement with the observations made by other investigators on similar alloys. Such experiments can easily be used to forecast the life of an ultracentrifuge in a uranium enrichment plant.

Key words: Creep, Aluminium-magnesium-zink-copper alloys, cyclic loading, Centrifuge rotors Creep life, Flow-turned tubes.

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THE REACTIONS OF ETHYLACETODIAZOACETATE AND DIMETHYLDIAZOMALONATE WITH CYLOHEPTENE IN THE PRESENCE OF COPPER (II) ACETYLACETONATE

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(Received January 14, 1989)

New compounds were obtained from a catalysed reaction of ethylacetodiazoacetate (eada) with cycloheptene. Reactivities of eada and dimethyldiazomalonate (dmdm) were compared by investigating the reaction of a mixture of these two diazocompounds with cycloheptene. The dimers and crossed dimers were also synthesized separately and used in the analysis of the reaction products. Dmdm was found to be more reactive and more electrophilic.

Key words: Ethylacetodiazoacetate, Cycloheptene, Dimethyldiazomalonate.

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CONDENSATION OF 4-ACETYL-1-ARYL-3-METHYL-2-PYRAZOLIN-5-ONES WITH AMINO AZOLES*

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(Received November 15, 1988; revised February 4, 1989)

Condensation of the 4-acetyl-2-pyrazolin-5-ones (1) with 2-amino-5-ethyl-1, 1, 3, 4-thiadiazole, 3-amino-1, 2, 4-triazole, 5-aminotetrazole, 2-aminobenzimidazole and/or 3-amino-1-phenyl-2-pyrazolin-5 one was investigated. The structures of the products were confirmed by IR, ^{1}H-NMR and mass spectral data.

Key words: Condensation, Amino azoles, Heterocyclic synthesis.

INTRODUCTION

It seemed of interest to us to react (1a) with 3-amino-1

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A STUDY ON THE DISSOLUTION OF LEAD IN NITRIC ACID

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(Received November 20, 1988; revised February 14, 1989)

The dissolution of lead in nitric acid solutions of varying concentrations has been studied using weight loss technique and polarization measurements. The effect of flouride, chloride, bromide and iodide ions on the dissolution of lead in 1.0 N HNO_3 has been examined. It has been found that all these anions decrease the dissolution of lead in 1.0 N nitric acid and acted as cathodic inhibitors. The effect of parameters like inhibitor concentration, time of immersion and temperature has also been investigated.

Key words: Lead, Dissolution, Nitric acid.

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QUANTITATIVE INFRARED DETERMINATION OF SOME ACTIVE CONSTITUENTS OF DRUGS

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(Received December 28, 1986; revised February 23, 1989)

An infrared method involving the use of base line technique for the assay of aspirin, nicotinamide, meprobamate and salicylamide in neat solutions, pharmaceutical products and laboratory prepared multicomponent mixtures has been described. Method is simple, rapid and shows good results. Assay of authentic samples and pharmaceutical products has shown percentage error of 1-2 %. However, the assay of multicomponent mixtures has shown results of moderate accuracy.

Key words: Infrared, Aspirin, Nicotinamide.

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INFLUENCE OF ALUMINIUM ON pH AND RECOVERY OF EXCHANGEABLE ALUMINIUM FROM PEAT

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(Received June 14, 1988)

Incubation experiment was conducted to obtain information on the extent of acidity developed due to added $AlCl_3$ (0, 25, 50 and 100 μg g^{-1}) at different pH levels and changes in exchangeable Al in peat. Results showed that Al at high pH is hydrolysed causing an increased acidity by releasing H^+ from hydroxy aluminium compounds. Concentration of exchangeable Al is tremendously reduced with increasing pH possibly due to formation of mono-aluminium compounds or polynuclear complexes of hydroxy aluminium. Extractable Al in 1M KCl was very low because of the presence of organic binding sites in peat. Thus, the recovery of exchangeable Al from Fison peat (I) containing more humified material was extremely low (1.0-2.1%) in comparison to Red Moss peat (47.6-52.8%).

Key words: Exchangeable Al, Hydroxy Al compounds, Peat.

Biological Sciences Section

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THEORETICAL APPROACH TO LIFE PROCESSES
Part III. Plant Processes and Aging

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(Received June 10, 1988; revised February 4, 1989)

Aging is suggested to involve dehydration as the preferred mechanism in the time-frame of biological reactions. It becomes dominant with time and inhibits life processes by gradually depositing the lyophobic metabolites in the microcapillaries. The flow of plant fluids is thus retarded and slows down the biological functions.

Small changes in the micro-environment of the plant e.g. introduction of ions like Ca in their biopolymer framework can initiate changes in the flexibility and conformation of DNA as well as the mode and extent of bonding of charged ligands including the gene regulating proteins. Such reactions lead to formation of an anionic terminal group by dehydration of the concerned portion of the biopolymer, giving rise, if not repaired through rehydration by the life propagating processes, to aging of the tissues.

Key words: Aging, Plant processes, Life processes, Dehydration, Hydrogen bondability.

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THEORETICAL APPROACH TO LIFE PROCESSES
Part IV. Plant Growth/Aging in Saline Environment

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(Received November 7, 1988; revised February 4, 1989)

The hypothesis holding dehydration as one of the major processes governing aging has been examined by considering plant processes viz. cell growth, turgor pressure, hydraulic conductivity of tissues, water potential of system and expanding leaf, and hydrogen bondability of solutes in plant fluids in terms of Lockhart's equation, and the process of dehydration which leads to aging. The process of aging is deduced directly from Lockhart's equation, from which it is inferred that ionic and/or hormonal interaction in a water deficit environment in leaves results in the introduction of cross-linkages.

The property of the cell wall to keep hydrated by extending the hydrogen bonding network in a given micro-environment and time frame and the role of hydrogen bondable organic solutes, and inorganic ions whose degree of hydration and osmotic potential is low has been described. Ionic imbalances are created due to excess supply over demand which finally give rise to apoplastic ion concentration. The resultant salt damage creates an imbalance in water relations of the neighbouring cells. Water is withdrawn from the protoplast and the consequent loss in the degree of hydration, loss of turgor and cellulor desiccation lead to the death of the plant. Accordingly, the hypothesis suggests that cells can grow only if an optimum degree of hydration prevails to allow maintenance of turgor. It further points towards the continuous need for the uptake of hydrated ions and hydrogen bondable solutes through the roots and their despatch to the shoots.

Ions are required for maintaining turgor and cell expansion and their supply is deterministic of growth. The expanding leaf has to compete for the available sodium chloride which provides the cross-linkages necessary for its maturity.

Key words: Aging, Plant process, Life, Dehydration, Cell wall.

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INVESTIGATION ON MULTI-ORGAN HEAVY TRACE METAL CONTENT OF MEAT OF SELECTED DAIRY, POULTRY, FOWL AND FISH SPECIES

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(Received June 28, 1988; revised February 19, 1989)

The muscle, liver and kidney meat of various dairy, poultry, fowl and fish species was analyzed for Mn, Cr, Zn, Cu, As, Hg, Pb, Fe, Ni and Cd content by atomic absorption method. The concentrations of essential trace metals (Fe, Cu, Zn and Mn) were found to follow the order liver kidney muscle while the concentration of non-essential metals followed the order kidney liver muscle. Zinc and iron were found to be the most abundant metals, their respective maximum levels being 74.15 µg/g in liver of Rohu fish and 75.1 µg/g in liver of pigeon. Lead, cadmium and nickel were found at lower concentration levels ranging between 0.03-1.90, 0.01-1.51 and 0.10-4.12 µg/g in different organs of the species. Old animals were found to accumulate higher metal levels in their muscle, liver and kidney.

Key words: Multi-organ analysis, Trace metals in meat, Heavy metal enrichment studies on meat.

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THE POLY-*N*-ACETYLLACTOSAMINE CHAINS IN GLYCOPROTEINS SYNTHESIZED BY CHINES HAMSTER OVARY CELLS AT 20° AND 37°HAVE SIMILAR STRUCTURES

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(Received June 26, 1989)

We have found recently that many of the poly-*N*-acetyllactosamine sequences in glycoproteins synthesized by Chinese hamster ovary (CHO) cells contain terminal sialic acid residues linked ∝ 2, 3 to penultimate galactose residues. However, we also found that in the wheat germ agglutinin-resistant CHO cell line clone 1021, which is unable to sialylated either its glycoproteins or glycolipids, the poly-*N*-acetyllactosamine chains are the same length and overall size as those from CHO cells. These results suggests strongly that sialylation of poly-*N*-acetyllactose-amine chains in glycoproteins does not serve to limit the length of newly-synthesized chains. To investigate other factors that might influence the biosynthesis of these chains, we have analyzed the effect of low temperature on the structures of newly synthesized poly-*N*-acetyllactosamine chains. Reports by other investigators have demonstrated that at 20°, newly synthesized glycoproteins in animal cells are sequestered in the Golgi apparatus and terminally glycosylated; however, at this temperature transport of glycoproteins to the cell surface is blocked. We have found that the radiolabeled glycopeptides derived from CHO and glycoproteins synthesized in cells at 20° in the presence of [6-H^3]·galactose are similar in length and to those made at 37°; however, at 20° most of these glycoproteins are not expressed on the surface of the cells. These results demonstrate that low temperature block of glycoprotein translocation in cells does not result in substantial alterations in the structures of newly synthesized poly-*N*- acetyllactosamine chains.

Key words: Poly-*N*-acetyllactosamine, Effect of temperature, Glycoproteins

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STUDIES ON PAKISTANI ROSE OIL

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(Received October 20, 1987; revised February 28, 1989)

The rose oil obtained from the flowers of "Red rose" (*Rosa indica*, N.O. Roszacea) cultivated in the lower part of Sind (Pakistan) has been investigated for the first time in Pakistan with respect to its physico-chemical values and chemical composition. The percentage of its main constituents has been recorded as; rhodinol – 36.3 %, geraniol – 24.4 %, phenylethyl alcohol – 12.1 % and nerol – 7.6 % through G.C./M.S. The physico-chemical constants were found as : d_{15}^{30} – 0.8627, n^{25} – 1.4640, congealing point – 17.3°, m.p. – 18.7°, ester no. – 8.5, sap. no. – 16.2, total alcohols – 83.3 %, stearoptene 8.22 %.

Key words: Rose, Rosaceae, Rhodinol. *Rosa indica,* Rose otto.

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ULTRASTRUCTURE OF *SCLEROTIUM ROLFSII* SACC. AND *SCLEROTIUM DELPHINII* WELCH, AFTER BURIAL IN SOIL

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(Received November 3, 1987; revised February 20, 1989)

The external and internal changes of dried and non-dried sclerotia of *Sclerotium rolfsii* Sacc. and *Sclerotium delphinii* Welch, after burial in soil for four weeks, were studied with stereoscan electron and light microscopes respectively. The sclerotia of both species were cultured on malt extract agar and tomato plant tissues. The external surface of dried sclerotia of *S. rolfsii* and *S. delphinii* were seen colonized by soil mycoparasites within two weeks. From third to fourth week most of the dried sclerotia became hollow shells. The internal examination of the sclerotia showed that the reproductive bodies of different mycoparasites embeded within the medullary tissues. The non-dried sclerotia were seen not effected by any soil fungi upto fourth week of burial.

Key words : Ultrastructure, Sclerotia, Mycoparasites.

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HISTOCHEMICAL LOCALIZATION OF PROTEINS AND ALKALINE PHOSPHATASE IN DIFLUBENZURBON TREATED INSECTS

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(Received September 25, 1988, revised February 17, 1989)

The proteins and alkaline phosphates were localized histochemically through electrophoresis, in diflubenzuron (DFB) treated *Musca domestica* (L.) (PCSIR strain) larvae and *Blattella germanica* (L.) (Karachi University strain) nymphs, respectively. In *M. domestica* DFB at 0.03125% inhibited proteins to some extent while at a higher dose (0.5%) the inhibition was negligible. The alkaline phosphatase was inhibited by DFB with little variation in the two doses. In *B. germanica* at 0.03125% dose DFB was more active than at 0.0625%, and inhibited a number of protein bands and showed a regular inhibition of enzymes with the increase in dose.

Key words: Protein, Alkaline phosphate, Diflubenzurbon.

INTRODUCTION

The 1% stock solution of dimilin or DFB was prepared

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EFFECT OF WATER PROPERTIES AND DOMINANT GENERA OF PHYTO-PLANKTON ON THE ABUNDANCE OF AVAILABLE GENERA OF ZOOPLANKTON

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(Received April 7, 1988; revised February 12, 1989)

The combined effect of physico-chemical properties of water of nursery ponds was significant ($P < 0.05$) on the growth of *Volvox* (R = 0.852), *Ulothrix* (R = 0.765), *Anabaena* (R = 0.769) and *Microcystis* (R = 0.759) which covered 72.63, 57.15, 59.61 % of the total analyses, respectively. The combined effect of available genera of phytoplankton on the growth of the genera of zooplankton was not significant ($P > 0.05$). The growth of *Catla catla* and *Labeo rohita* juveniles were higher in pond 5, than other ponds. But the growth of *Cirrhina mrigala* fry was relatively higher in pond 1 and than other nursery ponds. The significant ($P < 0.05$) correlation coefficient values of *Volvox, Ulothrix, Anabaena* and *Microcystis* with most of the physico-chemical properties were positive in nature. All the genera of phytoplankton were inversely correlated only with free CO_2. Again, *Filinia* and *Cyclops* had strong ($P < 0.001$) direct and inverse correlations with *Anabaena* (r = 0.690) and *Microcystis* (r = 0.639), respectively.

Key words: Productivity; Water properties; Combined effect.

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EFFECT OF BLANCHING AND STORAGE CONDITIONS ON THE CHEMICAL COMPOSITION OF OYSTER MUSHROOMS (*PLEUROTUS OSTREATUS* SPP.)

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(Received February 17, 1988, revised November 20, 1988)

The investigations were carried to study the effect of blanching times and storage conditions on the chemical composition of dehydrated oyster mushrooms. The sliced mushrooms were blanched in hot water at 98° for 0, 2, 5 and 7, minutes and sulphited by dipping in 0.25% $K_2 S_2 O_5$ solution for 15 minutes. The dehydrated mushrooms were stored in polyethylene bags for 6 months at 20° and at ambient temperatures. The results showed that moisture content was reduced greatly in dehydrated mushrooms stored at ambient temperature, whereas it was increased stored at constant 20° temperature. The ether extracted lipid, protein and crude fibres contents decreased during storage. The ash content increased from 8 to 12% when stored at 20° and whereas it decreased from 11 to 15% under storage at ambient temperature conditions.

Key words: Oyster mushrooms, *Pleurotus ostreatus* spp., Chemical composition.

Technology Section

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THE FATTY ACIDS OF INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS

Part XVII. The Fatty Acids Composition of the Fixed Seed Oils of *Ocimum basilicum* and *Ocimum album* Seeds

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(Received January 29, 1989; revised February 26, 1989)

The fixed oils of the seeds of *Ocimum basilicum* and *O. album* (Lamiace ae) were investigated for their physico-chemical properties and chemical composition. The percentage yields of the oils are 21.4 and 15.5 respectively. The fatty acid composition of the seeds oils of *Ocimum basilicum* and *O. album* as determined by GLC are Capric (0.00, 1.30%), lauric (0.85, 0.78%), myristic (0.36, 0.65%), palmitic (9.70, 11.68%), stearic (5.45, 2.33%), oleic (13.33, 44.16%), linoleic (21.81, 36.36%), linolenic (48.50, 0.00%) and arachidic (0.00, 2.73%) acids respectively.

Key words: Seed oil, Fatty acid, *Ocimum basilicum*, *Ocimum album*.

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STUDIES ON THE EVALUATION OF DDT AND BHC IN GELATINE SOLUTION AS WOOD PRESERVATIVES AGAINST TERMITES IN COMPARISON WITH DIELDRIN

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(Received September 1, 1988; revised February 21, 1989)

Studies on the evaluation of DDT and BHC in gelatine solution were undertaken as wood preservatives against termite attack by grave-yard testing methods. Wooden stakes treated separately with DDT 3.5% and BHC 2.5% in gelatine solution were found to be safe against termites in soil for four and half and five years respectively. Whereas control stakes were severely damaged within six months. Stakes treated with dieldrin 0.5% in gelatine solution used as standard termiticide for comparison remained unattacked for five years.

Key words: DDT, BHC, Termite control.

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PRODUCTION OF BIOGAS FROM DRIED BANANA PEELINGS

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(Received December 28, 1988; revised February 18, 1989)

The dried banana peelings provided sufficient amount of biogas to make the process economically feasible. The composition of the biogas included approximately 70% methane. It was also found that banana peelings mixed with cowdung increased the yield of biogas.

Key words: Banana peelings, Biogas.

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STUDIES ON SINGLE STAGE BLEACHING
PART-II. Bleaching of Soda-Sulphur Rice-Straw Pulp with Sodium Hypochlorite

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(Received November 8, 1987, revised February 4, 1989)

Soda-sulphur rice-straw pulp is new one. So studies on its bleaching by sodium hypochlorite are also new findings. Writing and printing paper may be made of it, and better grade newsprint can be easily prepared from laboratory evaluated unbleached soda-sulphur pulps.

Key words: Hypochlorite bleaching, Soda Sulphur, Rice Straw pulp.

Short Communication

Pak. j. sci. ind. res., vol. 32, no. 2, February 1989

CHEMICAL INVESTIGATION OF *BLEPHARIS SINDICA* STOCKS

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(Received June 26, 1988; revised January 30,1989)